AMENDMENTS TO THE CLAIMS

IN THE CLAIMS:

A complete set of claims is provided below.

Please cancel Claims 25-34 without prejudice.

Please amend Claims 1, 9, 10, and 35 as indicated below.

1. (Currently Amended) An apparatus for controlling the movement of a catheter-like tool having a distal end responsive to a magnetic field and configured to be inserted into the body of a patient, comprising:

a magnetic field source for generating a magnetic field, said magnetic field source outside the body;

a radar system to measure ~~a location of said distal end~~ **radar data**;

a sensor system to measure positions of a plurality of fiduciary markers;

a user input device for inputting commands to move said distal end; and

a system controller for controlling a direction and amplitude of a magnetic field produced by controlling a plurality of currents in electromagnets of said magnetic field source in response to inputs from said user input device, said radar system, and said sensors **said system controller configured to compute a location of said distal end by using said radar data to identify contrast between said distal end and body tissues, said contrast resulting from the relative dielectric constants of said distal end and the body tissues**.

2. (Previously presented)The apparatus of Claim 1, said system controller comprising a closed-loop feedback servo system to position said distal end with respect to one or more of said fiduciary markers.

3. (Original) The apparatus of Claim 1, said radar system comprising an impulse radar.

4. (Original) The apparatus of Claim 1, said distal end comprising one or more magnets.

5. (Original) The apparatus of Claim 1, where said system controller calculates a position error and controls said magnetic field source to move said distal end in a direction to reduce said position error.

6. (Original) The apparatus of Claim 1, where said system controller integrates a position data of said distal end with a set of fiduciary markers.

7. (Original) The apparatus of Claim 1, where said system controller synchronizes a location of said distal end with a fluoroscopic image.

8. (Original) The apparatus of Claim 1, further comprising an operator interface unit.

9. (Currently Amended) The apparatus of Claim 1, wherein said system controller compensates for a dynamic position of ~~an organ~~ **a wall of a heart chamber**, thereby offsetting a response of said distal end to said magnetic field such that said distal end moves in substantial unison with said ~~organ~~ **wall**.

10. (Currently Amended) The apparatus of Claim 1, wherein a correction input is generated by an auxiliary device that provides correction data concerning a dynamic position of ~~an organ~~ **a wall of a heart chamber**, and wherein said correction data are combined with

measurement data from said radar system to offset a response of said control system so that said distal end moves substantially in unison with said ~~**organ**~~ **wall**.

11. (Original) The apparatus of Claim 10, wherein said auxiliary device comprises at least one of an X-ray device, an ultrasound device, and a radar device.

12. (Original) The apparatus of Claim 1, wherein said user input device comprises a virtual tip control device to allow user control inputs.

13. (Original) The apparatus of Claim 1, further comprising: a virtual tip with force feedback.

14. (Original) The apparatus of Claim 1, further comprising:
an X-axis controller and amplifier;
a Y-axis controller and amplifier; and
a Z-axis controller and amplifier.

15. (Original) The apparatus of Claim 1, said sensor system comprising a 6-DOF sensor.

16. (Original) The apparatus of Claim 1, wherein said radar device comprises a phased array.

17. (Original) The apparatus of Claim 1, wherein said system controller coordinates operation of an X-axis Controller, a Y-axis Controller, and a Z-axis Controller, and wherein said user input device comprises a virtual tip.

18. (Original) The apparatus of Claim 17, wherein said Virtual Tip provides tactile feedback to an operator.

19. (Original) The apparatus of Claim 17, wherein said Virtual Tip provides tactile feedback to an operator according to a position error between an actual position of said distal end and a desired position of said distal end.

20. (Original) The apparatus of Claim 17, wherein said system controller causes said distal end to follow movements of said Virtual Tip.

21. (Original) The apparatus of Claim 1, wherein said radar system is configured to measure second harmonics produced by said distal end.

22. (Original) The apparatus of Claim 1, further comprising a virtual tip controller, wherein said Virtual Tip Controller outputs a tactile feedback response control to a Virtual Tip.

23. (Original) The apparatus of Claim 1, wherein said system controller is configured to calculate a position error of said distal end of the catheter tip using at least in part data from said radar device and the 6-DOF sensor in order to control said magnetic field source to reduce said position error.

24. (Original) The apparatus of Claim 1, wherein said system controller initiates a tactile feedback response by providing feedback data to said user input device.

25.-34. (Canceled)

35. (Currently Amended) An apparatus for controlling movement of a tool having a distal end to be inserted in a body, comprising;

a magnetic field source configured in a cluster-like arrangement on a C-Arm forming a magnetic circuit and generating a magnetic field, said magnetic field source comprising a first plurality of electromagnet coils provided substantially above the body and a second plurality of electromagnet coils provided substantially below the body;

a tool having a distal end responsive to said magnetic field;

~~one or more piezoelectric rings disposed about said distal end;~~ and

a system controller for regulating electrical currents in said first plurality of electromagnet coils and said second plurality of electromagnet coils to produce a desired strength and orientation of said magnetic field to provide a position and command input to control said tool distal end position **to produce substantially simultaneous rotation and elevation of said distal end**; and

a radar system for measuring a position of said distal end.

36. (Original) The apparatus of Claim 35, further comprising a closed servo loop system that receives said position and command input from said system controller, to regulate said magnetic force.

37. (Original) The apparatus of Claim 35, further comprising a radar system to locate said distal end.

38. (Original) The apparatus of Claim 35, wherein said system controller is configured to calculate respective torque and associated current for said magnetic source to configure said magnetic field to move said distal end to a desired location.

39. (Original) The apparatus of Claim 36, wherein said system controller provides a closed servo loop circuit that corrects for movement of an organ in the body such that said distal end moves substantially unison with said organ.

40. (Original) The apparatus of Claim 39, wherein data about movement of the organ is generated by an auxiliary device that provides dynamic data concerning said movement, and wherein when said dynamic data are combined with measured positions of a plurality of fiduciary markers that define a stereotactic frame.

41. (Original) The apparatus of Claim 40, wherein said auxiliary device comprises at least one of: a fluoroscopic imaging system, and ultrasonic imaging system, or a radar imaging system.

42. (Original) The apparatus of Claim 35, further comprising a Virtual Tip, wherein movement of at least a portion of said Virtual Tip causes said system controller to control said magnetic field source to move said distal end correspondingly.

43. (Original) The apparatus of Claim 35, further comprising a mechanical system for moving portions of said magnetic field source to reduce a current needed to produce a desired magnetic field strength.

44. (Original) The apparatus of claim 43, wherein said system controller uses at least position data from said radar system and fiduciary marker position data from a 6-DOF sensor to compute a position of said distal end with respect to a stereotactic frame.